

REDESCRIPTION OF *PARASARCOPHAGA REPOSITA* LOPES (DIPTERA: SARCOPHAGIDAE)

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Abstract

The male of *Parasarcophaga reposita* Lopes is redescribed and the female and immature stages described for the first time.

Introduction

This species was described by Lopes (1959) from a single male specimen in the Australian National Insect Collection, CSIRO, Canberra. This specimen is now in a very poor condition with only the head, thorax and forelegs remaining, and all the major bristles and both wings missing. In addition, a large part of the specimen is covered with a fine fungal mat. The specimen bears the data: Sydney, N.S.W. Bred 1902. Feeding in a spiders cocoon.

During 1980, I received adults and immature stages of a sarcophagid reared from the egg cases of *Cyrtophora moluccensis* (Doleschall) (Araneidae) from Queensland and Papua New Guinea. Comparison of the aedeagus and claspers with Lopes' illustrations, together with the unusual host association allowed me to identify them as *Parasarcophaga reposita* Lopes. Since this species is only known from the holotype, the opportunity is taken to describe the other stages.

The host relationship of this species is most interesting (Lubin, 1974), as larvae of other Sarcophaginae feed either in decomposing organic matter or as internal parasites of insects. So far *P. reposita* has only been reared from *C. moluccensis*, and it would be interesting to examine the egg cases of other large spiders for parasitism. Two puparia from Papua New Guinea were hyperparasitised by a species of Hymenoptera, but unfortunately only larvae are available and identification is not possible.

Representative specimens are deposited in the Entomology Branch, Queensland Department of Primary Industries.

Parasarcophaga reposita Lopes

MALE

Head golden pollinose; interfrontal area, antennae and palps dark. A row of ten to twelve frontal setae descending to level of middle of second antennal segment. One pair of reclinate orbital setae. Ocellar setae proclinate, as strong as upper frontals. Inner vertical setae very large, converging; outer verticals absent. Two rows of black setae behind eyes; remainder of hairs pale. Parafacials bare except for row of three or four setae near lower anterior corner of eye, but in some specimens a weak row of fine setae above these. Vibrissae strong, crossed; a series of fine setae above extending about half way up facial ridges. Genal hairs black. Parafrontals and interfrontals finely haired; vertex 0.17-0.19 of head width.

Thorax golden pollinose, with three dark vittae dorsally, median one extending on to scutellum. Spiracles dark. Three humeral setae standing in a triangle; three notopleurals; pre-alar seta present; two supra-alar; three postsutural intra-alar, anterior one small; three pre-, four postsutural dorso-centrals; three pre-, one postsutural acrostichals; scutellum with three pairs of marginal bristles, including strong, crossed, upwardly-directed apicals and with subapicals inserted far apart, distance between their bases greater than that between a subapical seta and the corresponding basal seta; three sternopleural setae (2 + 1).

Legs grey. Fore femur with strong dorsal (*d*), postero-dorsal (*pd*) and postero-ventral (*pv*) setal combs; tibia with two antero-dorsal (*ad*), one *pv* setae, and *ad*, *d*, *pd* (small) and *pv* (strong) apical setae. Mid femur with two distal *pd* setae, two *ad* setae and *av*, *pv* setal combs; tibia with submedian ventral seta, one strong *ad*, two *pd* setae, and *ad*, *d*, *pd*, *av* and *pv* apical setae. Hind femur with *ad*, *av* and *pv* setal combs and one distal *pd* seta; tibia with three *ad* setae and row of smaller setae between, two *pd*, one *av* setae, and *ad*, *d*, *av* and *pv* apical setae.

Wings. Basicosta pale, tegula dark. Basal node of R_{4+5} dorsally with row of short setae extending about half distance to *r-m*, ventrally with three or four small setae.

Abdomen chequered with silver pollinosity. T_{1+2} excavate to hind margin. $T_{1+2, 3}$ without discal or marginal setae dorsally; $T_{4, 5}$ with complete marginal rows of setae. Claspers (Figs 1, 2) strong, aedeagus (Figs 2, 3) with serrate styli. Fifth sternite (Fig. 4) deeply cleft, with marginal setae.

FEMALE

Differing from male as follows:

Head. Vertex wider, 0.25-0.28 of head width. Two pairs of proclinate orbital setae and divergent outer vertical setae present, latter about two-thirds the length of the inner verticals.

Thorax. Apical scutellar setae absent.

Wings. Dorsal setae on R_{4+5} extending further towards *r-m*.

Abdomen. Sternites 2-5 with strong marginal bristles. Sternites 6, 7 (Fig. 5) also with marginal bristles, sternite 7 with posterior cleft. Tergite 6+7 entire.

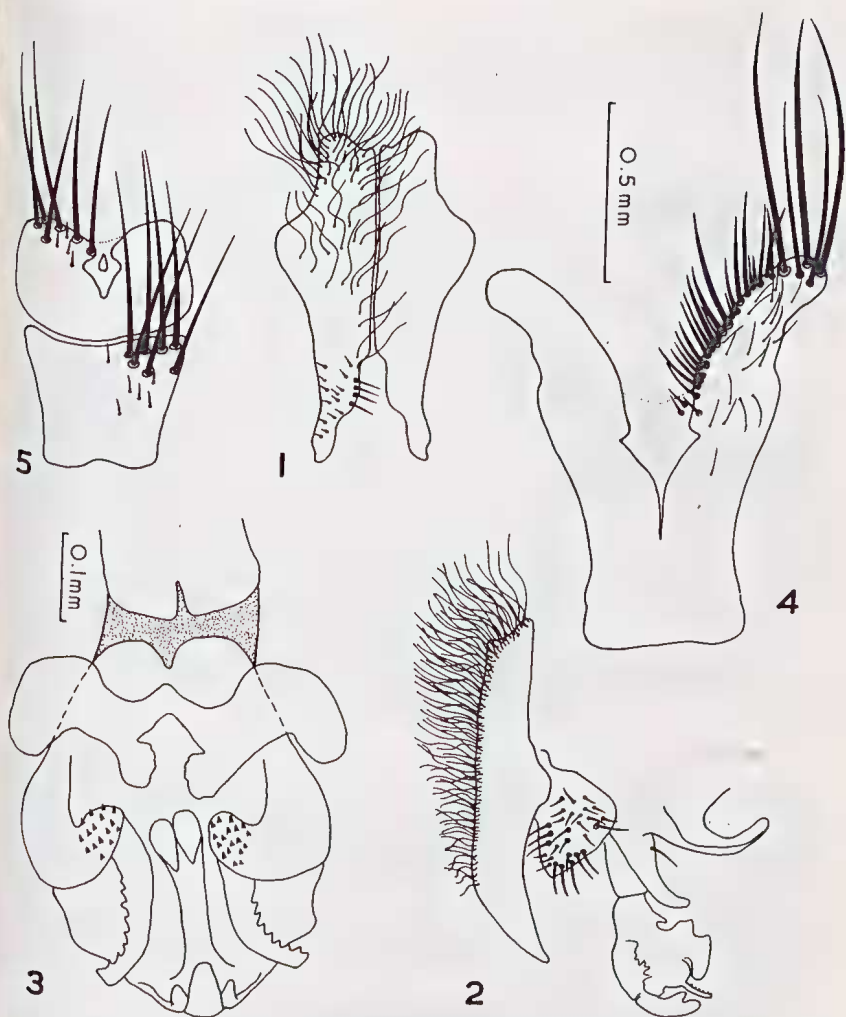
Measurements. Body length ♂♂ 8.0-13.0 mm, ♀♀ 9.0-12.5 mm (3♂♂, 2♀♀, Bayamatu village near Mumeng, P.N.G., 13.iii.1979, Y. D. Lubin; 8♂♂, 7♀♀, Brisbane, Q., 17.iv.1980, J. F. Grimshaw; 3♂♂, 1♀, Brisbane, Q., 29.xii.1980, J. P. Curgven).

EGG

White, of muscine type (Ferrar, 1979), oval, 1.4 x 0.3 mm.

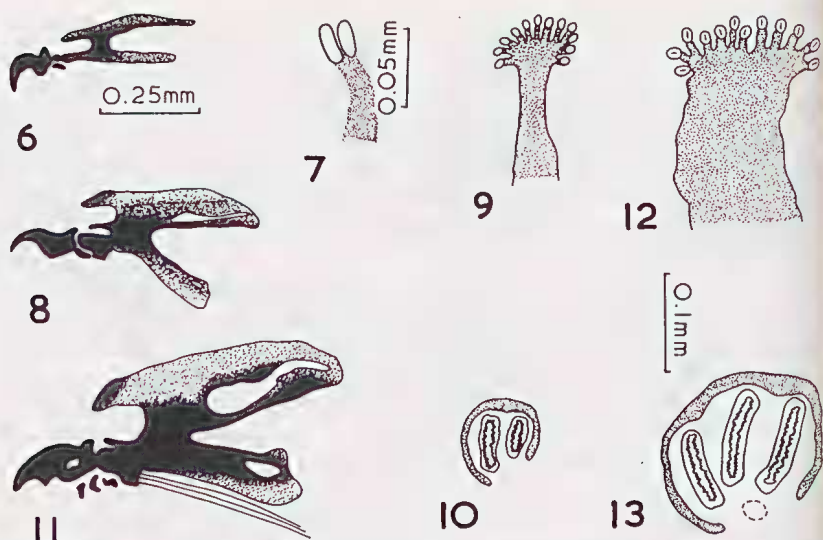
FIRST INSTAR LARVA

Twelve segmented; anterior sense organs on segment 1 of two types, both two segmented, one with conical second segment, other open distally



Figs 1-5. *Parasarcophaga reposita* Lopes. (1-4)♂: (1) claspers, posterior view; (2) claspers and aedeagus, lateral view; (3) tip of aedeagus, ventral view; (4) fifth abdominal sternite, ventral view. (5)♀ sixth and seventh abdominal sternites, ventral view. All to same scale except Fig. 3.

with a number of sensilla. Segments 2-12 (S2-12 below) with cuticular spine bands described below, typically with bands near anterior border of segments and with spines pointing posteriorly. Cephalopharyngeal skeleton (Fig. 6) with strongly curved mouth-hooks. Anterior spiracles on S2 only faintly visible under the light microscope as simple openings; posterior spiracles (Fig. 7) in pit on S12, each two oval slits and an elongate felt chamber visible through the cuticle.



Figs 6-13. *Parasarcophaga reposita* Lopes, larvae. (6-7) first instar: (6) cephalopharyngeal skeleton; (7) posterior spiracle. (8-10) second instar: (8) cephalopharyngeal skeleton; (9) anterior spiracle; (10) posterior spiracle. (11-13) third instar: (11) cephalopharyngeal skeleton; (12) anterior spiracle; (13) posterior spiracle. All lateral views except posterior spiracles, these dorsal views. Figs 6, 8, 11 and 9, 10, 12, 13 to same scales as indicated.

Spination. S2: anterior band *ca.* eight rows ventrally, anterior four slender and lightly sclerotized while posterior spines blunt and heavily sclerotized (Fig. 14); band tapers to *ca.* three rows midlaterally, then a distinct gap before continuing with *ca.* three rows mostly blunt, heavily sclerotized spines dorsally. S3, 4: anterior band *ca.* six rows short blunt spines, uniform all round body except for gap in same position as S2. S5: anterior band *ca.* six rows ventrally, but *ca.* four rows dorsally, with gap as S2. S6: anterior band *ca.* seven rows of smaller spines ventrally, tapering to *ca.* four rows below lateral midline, then a gap to a midlateral patch of spines *ca.* three rows wide and *ca.* ten spines tall; similar gap separates the dorsal part of the band of *ca.* two rows of spines. S7, 8: similar to S6, but midlateral patch and dorsal part of band progressively reduced. S9: anterior band *ca.* nine irregular rows of small spines, ventrally only. S10: band further reduced, *ca.* six rows ventrally. S11: band reduced to a rudimentary ventral patch of very small spines. S12: spines absent, but spiracular pit with fringe of fine hairs.

SECOND INSTAR LARVA

Twelve segmented, anterior sense organs similar to first instar. Cephalopharyngeal skeleton (Fig. 8) with narrow, curved mouth-hooks, windows in both cornua, prominent parastomal bars and ventral pharyngeal

ridges. Anterior spiracles (Fig. 9) with a simple fan of eleven or twelve rays; posterior spiracles (Fig. 10) sunk in a shallow pit, each with two slits and an incomplete peritreme. No larvae were available for a description of the cuticular spination.

THIRD INSTAR LARVA

Twelve segmented, anterior sense organs similar to first instar. Cephalopharyngeal skeleton (Fig. 11) with stout, curved mouth-hooks with a blunt ventral spine basally, windows in both cornua, prominent parastomal bars and ventral pharyngeal ridges. Anterior spiracles (Fig. 12) with a simple fan of twelve rays; posterior spiracles (Fig. 13) in a very shallow pit without marginal lobes, each with three slits and an incomplete peritreme. Anal lobes reduced to small, rounded structures.

Spination. S2: anterior band of small, sharp spines, twelve rows ventrally tapering to *ca.* seven rows dorsally. S3, 4: anterior band *ca.* five irregular rows of widely spaced spines. S5: anterior band *ca.* four irregular rows ventrally, but only two or three rows dorsally. S6: anterior band *ca.* five irregular rows ventrally ending well below lateral midline, but with a small midlateral patch of spines, absent above. S7, 8: similar to S6, but midlateral patch smaller. S9-11: similar to S6, but midlateral patch absent. S12: anterior band consisting of a few scattered spines ventrally, but also a small patch of supra-anal spines.

Measurements. Length 8.5-11.0 mm, width 2.8-4.0 mm. (15 larvae, Brisbane, Q., 17.iv.1980, J. F. Grimshaw; 6 larvae, Wau, P.N.G., 24.x.1980, Y. D. Lubin).

PUPARIUM

Reddish brown, barrel-shaped; no puparial respiratory structures visible. Larval spiracles exposed, surrounded by a groove marking the edge of rudimentary larval spiracular pit (Fig. 17). Larval anus preserved as a distinct pit.

Measurements. Length 7.0-9.8 mm long by 2.8-4.5 mm wide. (20 puparia, Brisbane, Q., 17.iv.1980, J. F. Grimshaw; 11 puparia, Wau, P.N.G., 21-24.x.1980, Y. D. Lubin).

Discussion

The atypical host relationship of *P. reposita* has already been mentioned and some features of the larvae discussed below may be an adaptation to the unusual larval habitat, which is very dry in contrast to the fluid conditions experienced by carrion feeders.

Sarcophagid larvae are typically adorned with segmental bands of cuticular spines, normally arranged in distinct anterior and posterior bands (Cantrell, in press). These bands are usually better developed in first instar larvae and presumably help the larva to grip the substrate when moving in search of a suitable feeding site. Later instars show a progressive reduction in spination, probably correlated with their more sedentary habits. In the

parasitic larvae of *Blaesoxipha* Loew, spination of later instars is even further reduced (Cantrell, 1980), and similar reduction can also be seen in *P. reposita*, where posterior spine bands are completely lacking. Also, in contrast to most sarcophagids which leave the food source and pupariate in the soil, *P. reposita* pupariates within the spider egg cases.

The spine band on segment 2 of sarcophagid larvae is usually the best developed, consisting of numerous fine slender spines (Fig. 15), but in first instar *P. reposita* these are modified to a reduced number of heavy, blunt teeth (Fig. 14), the function of which is unknown. First instar *Blaesoxipha* larvae (Fig. 16), also show a reduction in the number of spines, but these are still pointed, and probably aid penetration of the host.



Figs 14-16. First instar larva, lateral view, showing spine bands: (14) *Parasarcophaga reposita* Lopes; (15) *Taylorimyia iota* (Johnston and Tiegs); (16) *Blaesoxipha similis* Cantrell.

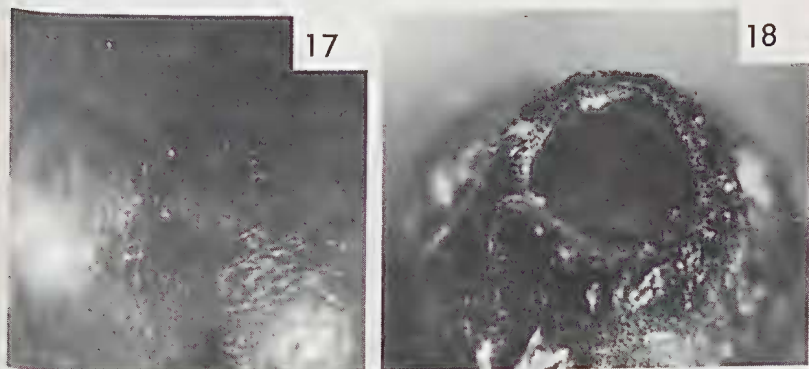
Most sarcophagid larvae have the posterior spiracles sunk in a deep caudal pit, and this is thought to be a means of keeping them free of fluid. Around the rim of the pit are usually six fleshy tubercles. However in *P. reposita*, particularly the third instar, the posterior spiracular pit is very shallow with the spiracles clearly visible, and no trace of a pit can be discerned in the puparium (Fig. 17). This is in contrast to most sarcophagids, where the spiracular pit is also visible in the puparium (Fig. 18). A similar reduction of the spiracular pit is found in *Tricharaea brevicornis* (Wiedemann) (Ferrari,

1979) although the marginal tubercles can still be discerned. These are completely lacking in *P. reposita*.

Third instar larvae of *P. reposita* can also be separated from all other known Australian species by the presence of a ventral spine on the mouth-hooks (Fig. 11).

Acknowledgements

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Figs 17-18. Puparium, posterior view: (17) *Parasarcophaga reposita* Lopes; (18) *Boettcherisca peregrina* (Robineau-Desvoidy).

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Note added in proof

Shinonaga and Barrion recently described *Pierretia litsingeri* sp.n., parasitic in the egg sacs of *Argiope catenulata* (Doleschall) in the Philippines, but no information is given on the immature stages. See "A new species of sarcophagid fly parasitic in the egg sac of the spider *Argiope catenulata* (Doleschall) in the Philippines". *Kontyû* 48: 537-9 (1980).